CLAIMS

What is claimed is:

1. A power supply system, comprising:

a power supplying unit supplying DC power;

a DC/DC converter having a plurality of phase processing units separating the DC power supplied from the power supplying unit into a plurality of phase currents to process the plurality of phase currents, with which the DC/DC converter converts the DC power into individual power supplies in a plurality of different voltages needed for each component of a computer system; and

a controller sensing the phase currents of each of the phase processing units of the DC/DC converter and controlling the power supplying unit so as to interrupt the DC power supply from the power supplying unit where a voltage corresponding to any one of the phase currents is higher than a predetermined reference voltage.

2. The power supply system according to claim 1, further comprising:

a reference voltage supplying unit supplying the predetermined reference voltage.

3. The power supply system according to claim 2, wherein the reference voltage supplying unit comprises:

an inductor disposed on a power line between the power supplying unit and the phase processing units; and

an amplifier amplifying a voltage induced across first and second terminals of the inductor at a predetermined rate.

4. The power supply system according to claim 3, further comprising:

a resistor and an FET, so as to comprise a unit in which the resistor is connected between a source terminal and a drain terminal of the FET on a ground side thereof, the unit being provided in each of the phase processing units, wherein the resistor is used to sense the

voltage corresponding to the phase current of the respective phase processing units.

5. The power supply system according to claim 1, wherein the predetermined reference voltage corresponds to a maximum coincident current of the phase processing units.

6. The power supply system according to claim 2, wherein the predetermined reference voltage corresponds to a maximum coincident current of the phase processing units.

7. The power supply system according to claim 3, wherein the predetermined reference voltage corresponds to a maximum coincident current of the phase processing units.

8. The power supply system according to claim 4, wherein the predetermined reference voltage corresponds to a maximum coincident current of the phase processing units.

9. A method of controlling a power supply system having a power supplying unit supplying a DC power, and a DC/DC converter having a plurality of phase processing units separating the DC power supplied from the power supplying unit into a plurality of phase currents to process the plurality of phase currents, with which the DC/DC converter converts the DC power into individual power supplies in a plurality of different voltages needed for each component of a computer system, comprising:

sensing the phase current of each of the phase processing units;

comparing a voltage corresponding to the sensed phase current of each of the phase processing units with a reference voltage; and

controlling the power supplying unit so as to interrupt a power supply from the power supplying unit where the voltage corresponding to any one of the phase currents is higher than the predetermined reference voltage, as a result of the comparing.

10. The method according to claim 9, further comprising:

generating the predetermined reference voltage by amplifying a voltage induced across first and second terminals of an inductor disposed on a power line between the power supplying

unit and the phase processing units at a predetermined rate.

11. The method according to claim 9, wherein the predetermined reference voltage corresponds to a maximum coincident current of the phase processing units.

12. The method according to claim 10, wherein the predetermined reference voltage corresponds to a maximum coincident current of the phase processing units.

13. A power supply system having a DC power supply therein, comprising:

a DC/DC converter being supplied with DC power by the DC power supply and comprising:

a plurality of phase processing units to supply, respectively, a plurality of phase currents such that the plurality of phase processing units convert the DC power into a plurality of different voltages; and

a controller sensing a voltage corresponding to the phase currents of each of the phase processing units and interrupting the DC power supply when the sensed voltage corresponding to any one of the phase currents is higher than a predetermined reference voltage.

14. The power supply system according to claim 13, further comprising:

a reference voltage supplying unit supplying the predetermined reference voltage.

15. The power supply system according to claim 14, wherein the reference voltage supplying unit comprises:

an inductor disposed on a power line between the power supplying unit and the phase processing units; and

an amplifier amplifying a voltage induced across first and second terminals of the inductor at a predetermined rate.

16. The power supply system according to claim 13, wherein each of the phase processing units comprises:

a resistor and a transistor, so as to comprise a unit in which the resistor is connected between a source terminal and a drain terminal of the transistor and senses the voltage corresponding to the phase current of respective ones of the phase processing units.

17. The power supply system according to claim 14, wherein the predetermined reference voltage corresponds to maximum coincident current of the phase processing units.

18. The power supply system according to claim 17, wherein the maximum coincident current of the phase processing units is a sum of the maximum phase currents from each of the phase processing units.

19. The power supply system according to claim 13, wherein:

the controller comprises:

a pulse width modulation controller generating a pulse width modulation signal; and

each of the phase processing units comprise:

switching elements such that a turn-on/ turn-off period of the switching elements are controlled by the pulse width modulation controller to reduce the voltage supplied by each of the phase processing units.

20. The power supply system according to claim 17, wherein, when the sensed voltage is less than the maximum coincident current of the phase processing units, a distribution of each of the phase currents is substantially uniform.

21. The power supply system according to claim 13, further comprising:

a switching unit connected to an output of the DC power supply and interrupting the DC power supply according to a control signal from the controller.

22. The power supply system according to claim 13, wherein:

the DC power supply is an SMPS; and

the controller comprises:

a comparator outputs a control signal to the SMPS to interrupt power supply from the SMPS.

23. The power supply system according to claim 13, wherein:

the DC power supply is an SMPS; and

the controller comprises:

a microcomputer programmed so as to control the SMPS where the voltage corresponding to the phase current is higher than the predetermined reference voltage after comparing the voltage generated based on the phase current flowing in each of the phase processing units with the reference predetermined voltage.